PATENT COOPERATION TREATY

PCT

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Form PCT/IPEA/416
160405 S-KR		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/NO2005/000054	14.02.2005	12.02.2004
International Patent Classification (IPC) or national classification and IPC		
INV. B21J5/02		
Applicant		
RAUFOSS TECHNOLOGY AS et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in celectronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☒	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
12.12.2005	27.03.2006
Name and mailing address of the international preliminary examining authority:	Authorized officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Rechler, W Telephone No. +49 89 2399-2354

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/NO2005/000054

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-6 as published

Claims, Numbers

1-5 received on 02.01.2006 with letter of 23.12.2005

Drawings, Sheets

1/4-4/4 as published

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/NO2005/000054

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1 - 5
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1 - 5
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1 - 5
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item V:

1. Prior art documents US-A-3 825 648 and US-A-3 750 450 represent the closest state of the art. Both documents relate to closed die forging and disclose a method and a tool for forging a blank into a product. The respective dies (or die parts) or forging members, however, are moveable in one direction only.

2. The problem to be solved by the present invention was to improve the known methods and tools, especially with regard to a shorter flow of material resulting in a reduced press force.

   This problem is solved by the combination of features set out in the independent claims 1 (method) and 2 (apparatus), especially by the side members being moveable along an axis perpendicular to the centre members and thereby upsetting the outer parts of the blank.

3. The present invention shall be considered to be new because no cited prior art document discloses all features of independent claim 1 or 2 in combination.

4. The cited documents do not disclose the essential subject-matter concerning side members being moveable along an axis perpendicular to the centre members and thereby upsetting the outer parts of the blank at known forging methods or tools.

   Document US-A-4 407 056 discloses a perpendicular movement of several forging members. However, this document does not relate to closed die forging and, therefore, the problems (see pages 1 and 2 of the description) related to this kind of material treatment do not occur. The skilled person had no reason whatsoever, to provide this subject-matter at a method or a tool known from documents US-A-3 825 648 and US-A-3 750 450 and to combine all features defining the invention according to independent claim 1 or 2.

5. The invention shall be considered as susceptible of industrial application because it can be made or used in the metal processing industry.

6. Claims 3 - 5 are dependent on claim 2 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VII:

1. Independent claims 1 and 2 are not in the correct two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (see for example document US-A-3 825 648 or US-A-3 750 450) being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

2. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

3. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents US-A-3 825 648 and US-A-3 750 450 is not mentioned in the description, nor are these documents identified therein.

4. The reference to preceding claims should have been corrected in claims 3 - 5.

Amended Claims

filed 23 December 2005

1. A method for closed die forging a product from a preform blank of a forgeable material,
characterized in

- placing the blank in a press tool, said press tool including a number of centre and side members surrounding the blank,
- closing the press tool upon the blank by vertically clamping the blank between an upper and lower centre member,
- horizontally moving first and second side members synchronously towards said centre members centring the blank in the press tool,
- upsetting the outer parts of said blank with the first and second side members in a continuation of said horizontal movement,
- forcing the upper and lower centre members into the blank until the material of the blank fills a cavity defined by said centre and side members, by which the blank is forged with short horizontal and vertical movements of the tool avoiding large horizontal movements in the material.

2. A tool for forging a blank into a product with the method claimed in claim 1,
characterized in that the tool includes a number of upper (21) and lower (22) centre members, and first (23, 24) and second (25, 26) side members, said first (23, 24) and second (25, 26) side members being shaped as blunt wedges in the inner parts engaging the blank, said first (23, 24) and second (25, 26) side members enclosing said upper (21) and lower (22) centre members defining a closed cavity with the form of product,
said first (23, 24) and second (25, 26) side members being adapted to upset outer parts of the blank in short horizontal movements,
the upper(21) and lower (22) centre members being adapted

to be forced into the blank causing it to fill said closed cavity.

3. A tool as claimed in claim 4, characterized in said first (23, 24) and second (25, 26) side members having sloping outer surfaces, a number of press members (27, 28) with mating inner surfaces acting on said first (23, 24) and second (25, 26) side members in order to force said first (23, 24) and second (25, 26) side members together.

4. A tool as claimed in claim 5, characterized in said first (23, 24) and second (25, 26) side members comprising upper (23, 25) and lower (24, 26) parts.

5. A tool as claimed in claim 4 - 6, characterized in said first (23, 24) and second (25, 26) side members including brake surfaces forming a gutter.